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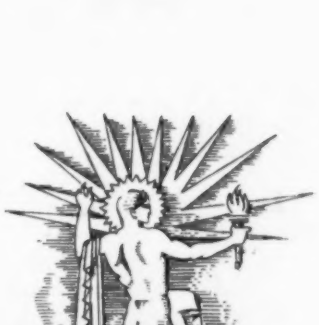
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



August 20, 1938

Sunspots Indoors

See Page 120

A SCIENCE SERVICE PUBLICATION

Do You Know?

A new form of magnesium carbonate produces a greater transparency in rubber.

Nineteen states have adopted the American Standard for saftey glass in automobiles.

The fastest clipper ships sailed from New York to San Francisco around the Horn in 89 days.

In tornado country, some of the filling stations are being equipped with cyclone cellar hotels.

Germany is trying to make felt hats out of milk wool, that is, wool made chiefly out of casein.

Harps, horns, and trumpets made music in old Mesopotamian cities, but the violin type of instrument was devised in India later.

It takes over 100,000,000 pounds of insecticides every year to keep insect pests from overwhelming United States crops and homes.

An ox cart used in transporting sacred animals to sacrifice in 225 B. C. was found in a vault of a temple on the Nile, and is now in the United States.

At the Leipzig Spring Fair, remedies exhibited this year included a variety of raw juices, including onion, peppermint, dandelion, birch leaf, and black radish.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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PUBLIC HEALTH

How many cities had no deaths from either diphtheria or typhoid in 1937? p. 125.

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Whence come present threats to the freedom of science? p. 117.

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How long should you wait before getting married? p. 122.

ZOOLOGY

Of what possible use is an Eland? p. 116.

What has become of Montezuma's zoo? p. 116.

North Dakota is trying to cross varieties of watermelon to produce a superior kind.

A large oak tree may have enough leaves to cover two acres, if spread in a carpet.

Bird's-eye pattern of maple is the result of buds forming under the bark, and unable to break through.

Holland dried out 48,000 acres of the Zuider Zee in 1930, and began reclaiming another 110,000 acres in 1936.

SCIENCE NEWS LETTER

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ASTRONOMY

Low-Density Globe of Stars Surrounds the Milky Way

Stellar Cluster Has 80,000 Light Year Diameter, Says Harvard Observatory Head at International Meeting

EARLIER indications that a tremendous, low-density globe of scattered stars surrounds our own disk-shaped galaxy, the Milky Way, are being confirmed at Harvard Observatory, Dr. Harlow Shapley, its director, reported to the International Astronomical Union.

According to preliminary calculations, this great globe has a diameter of the order of 80,000 light years, stretching out 40,000 light years both above and below the Milky Way disk. The diameter of this disk, which contains nearly all the stars of the system, is of the order of 100,000 light years.

The astronomical yardstick used for these investigations, Dr. Shapley explained, was the magnitude, or brightness, of more than 2000 cluster-type Cepheid variable stars which have been ferreted out and studied in all parts of the Milky Way. Since all stars of this type have the same candlepower—about 200 times that of the sun—their brightness as seen from the earth is an excellent measure of their distance.

Remote Variables

Harvard astronomers have found measurable numbers of these flickering stars as far out as 40,000 light years from the earth, Dr. Shapley said. These are apparently close to the outer edge of the Milky Way globe. The spatial distribution of the stars, he added, is such that there is no doubt that these distant stars are members of the Milky Way system.

Most of the 2000 stars studied in the research were discovered for the first time on Harvard plates during the course of the investigation.

Announcement of this new cosmic information was made by Dr. Shapley during a report before the Astronomical Union on Harvard's work in investigating the distribution of galaxies and the absorption of light in the Milky Way.

He also outlined one of the observatory's current projects to the Union—an attempt to determine the dimensions of the Milky Way system by comparative studies of variable stars and external galaxies seen through the "window" in the southern Milky Way. Already 400 new variable stars have been found in this area and a concurrent study has been made of the distribution and brightness of some 700 external galaxies in the same field.

New Type System

A few days later, speaking before the British Association for the Advancement of Science, Dr. Shapley reported the discovery of the second example of a new kind of immense but extremely faint star system. Only a few months ago Harvard astronomers found the first of these systems, called the Sculptor cluster, on a photograph made with the most powerful telescope in the Southern Hemisphere, the sixty-inch reflector at Bloemfontein, S. A.

The new star cluster is in the constellation of Fornax, only about twenty degrees from the Sculptor cluster. It is an immense aggregation of stars, probably about 300,000 light years distant from us. Dr. Shapley said that at least 5,000 individual stars in the Fornax system have been spotted.

Astronomers are rather excited about these discoveries because they have found a new kind of star grouping that "may have high significance in the general study of the nature of stellar systems. It is remarkable in that it is neither a globular cluster, nor a spheroidal galaxy, nor a Magellanic cloud, but has certain properties of all three of these well known kinds of stellar systems.

Science News Letter, August 20, 1938

● Earth Trembles

Information collected by Science Service from seismological observatories and relayed to the U. S. Coast and Geodetic Survey resulted in the location of the following preliminary epicenter:

Thursday, Aug. 4, 3:54.9 a. m., E.S.T.

In Salta Province, northern Argentina. Latitude 24 degrees south, longitude 66 degrees west.

For stations cooperating with Science Service in reporting earthquakes recorded on their seismographs, see SNL Aug. 13.

WINGED KING

Seventeen inches tall, this gold image of the first Chimu king is a rare relic of Peruvian prehistory. The knife below the ruler's feet is believed by Dr. Valcarcel, discoverer of the image, to signify that the king required sacrifices after he flew off from his people and became a god.

ARCHAEOLOGY

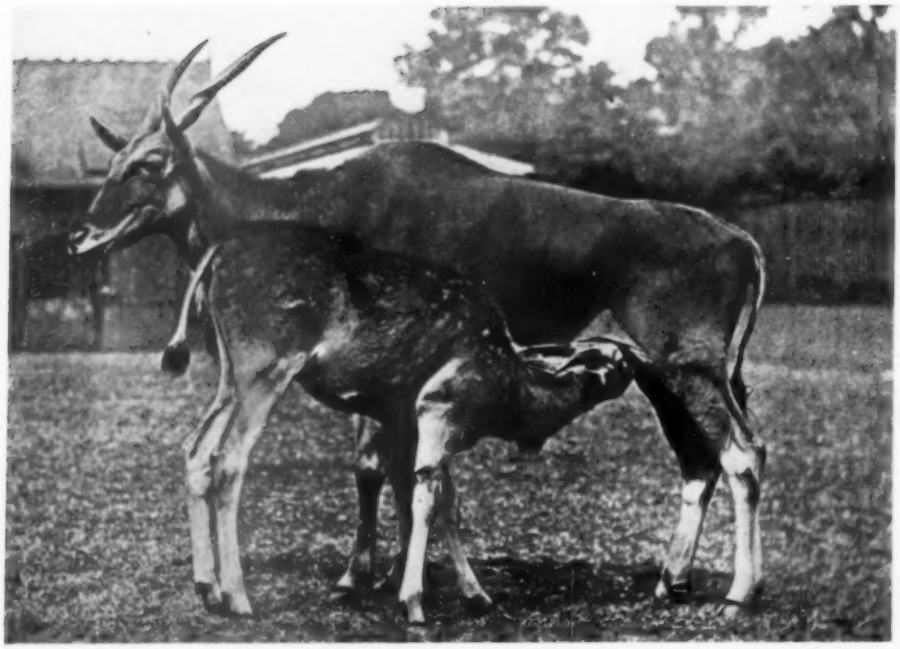
Winged-King Idols Found In Indian Treasure Tomb

GREATEST discovery of Indian treasure since the days of Pizarro! This is how Peruvian archaeologists regard their latest lucky find.

There are gold vases encrusted with turquoise. There are necklaces, spoons, knives and pins of gold and silver, and platelets of gold that were sewed on gala clothing. Most impressive of all are three gold idols.

The objects repose safely in the National Museum at Lima, where they were taken from the discovery place, in a funeral mound on Peru's northern coast.

They were found in a district called Illimo. The hoard of beautiful gifts to the dead were provided long ago by Chimu Indians, the inhabitants of the



WORK-ANIMAL FOR THE TROPICS?

Elands are quiet and well-behaved in zoological gardens, but how they might respond when first efforts were made to train them to harness is another question.

ZOOLOGY

Montezuma Had no Zoo—Writer Had Imagination

MONTEZUMA, lord of the Aztecs in Mexico, didn't have any fine zoo for his entertainment. That was just a yellow journalism story perpetrated back in 1684.

So the Bureau of American Ethnology declares, on bringing to light a seventeenth century yellow journalist named Antonio de Solis, who wrote a book on the Mexican conquest without bothering much about facts.

Solis got his zoo story by combining and embroidering records, say the Bureau ethnologists.

Diaz, soldier of Cortez, had described a collection of birds, rattlesnakes, and animals kept at the Aztec capital, presumably for sacrifice. Haklyut, the historian, described discovery of American bison. Solis scrambled these facts and made Montezuma a glamorous figure in zoo history, the collector of a wonderful exhibit of rare beasts.

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sandy north coast. Chimus were among the people swept into the great Indian Empire forged by ambitious Incan Indians a few centuries before America was discovered. When Spaniards invaded Peru, they collected four million dollars from one Chimu city alone. Spaniards thought the Indians pitiful savages, because they admired fine metal for its beauty and did not measure their wealth in gold.

Dr. Luis E. Valcarcel, director of the National Museum of Peru, is most impressed by the three gold idols. He concludes that all three represent the same Chimu character, and that is the first Chimu king, who was so great and good that when he died rumor said he flew off to heaven.

By tradition, this king, named Naymlap, came to Peru riding with his attendants in a fleet of rafts. They settled the north coast, and near the landing place they built a temple, with a statue of the king done in green stone.

That the idols represent the Chimu national hero is shown by: the large and very green turquoises decorating the statues; human features, replacing the animal fantasies popular in Peruvian idols; and two stiff little wings sprouting from the upper arms.

Science News Letter, August 20, 1938

In air conditioning, drying the air is often as important as cooling it.

ZOOLOGY

Suggests Domestication Of Big African Antelope

FARMERS in Africa may some day be able to harness big antelopes to their plows, and have their meat to eat and their hides to make into harness and boots. Domestication of the eland, an antelope bigger than most oxen, is suggested by Prof. Caesar R. Boettger of the University of Berlin, as a possible solution to Africa's cattle-pest problem.

The tsetse fly, Africa's most dreaded insect, is making parts of the continent uninhabitable because it carries the germs of a disease deadly to domestic cattle and other livestock of non-African origin. It deprives the natives of their chief form of wealth, and makes farming impossible to white settlers.

The native fauna of Africa are not totally immune to the tsetse-borne disease, ngana, but they are highly resistant to it. They survive when ngana wipes out whole herds of domestic cattle.

Chief obstacle to be overcome in using the eland or some other member of Africa's rich population of large hoofed animals is their alleged untamability. None of them has ever been domesticated in modern times.

However, Prof. Boettger believes that the difficulty lies not so much in the psychology of the animals as in that of the natives. They have just never taken the trouble to try, he thinks, and he points out the success of the Belgian efforts in the Congo, in making good work-animals out of the supposedly untamable African species of elephant.

Once in the remote history of Africa antelopes were kept in man-tended herds, Prof. Boettger states. Monuments of the oldest dynasties in Egypt show herds of three antelope species kept within enclosures. Antelope-keeping became a lost art, however, long before the end of antiquity in Egypt; perhaps because imported cattle were easier to manage and more profitable.

Immediate success could not be looked for, perhaps. But, probably, our Neolithic ancestors had to work on cattle, horses, and other animals for many generations before they became tractable and really worth their keep.

Science News Letter, August 20, 1938

SCIENCE

Scientists, Unite!

Science Must Have Freedom if Peace and Civilization Are to Survive; Dictatorship and War Are Foes of Knowledge

By WATSON DAVIS

THE MOST important problem before the scientific world today is not the cure of cancer, the discovery of a new source of energy, or any other specific achievement.

It is:

How can science maintain its freedom and how can it help preserve a peaceful and effective civilization?

If science is inundated by preconceived ideas and brought under the control of dictatorships, as it has in recent years in some countries, it will not continue to create that new knowledge that is necessary for human progress in the years and generations to come.

Oases of Freedom

Viewed frankly, the human intellect is free in the broad and important sense only in geographically limited areas of the globe: The English-speaking areas, France, Scandinavia, Switzerland, the Netherlands, hard-pressed Czecho-Slovakia, some other areas of the Western World, and few intellectual oases elsewhere.

Germany, Soviet Russia, Italy, and perhaps to a less extent Japan are molding science and other intellectual endeavors to suit nationalistic purposes. China and Spain have suffered the physical hardships of war in the midst of which science does not flourish. Even under dictatorships and restraints, some hardy intellects struggle to continue their work. Some sacrifice principles to accomplish research tolerated by the dictatorships, scientific jobs that do not conflict with ideologies or that actually aid self-contained nationalism.

A major conservation problem is the rescue of the scientists among the refugees from Germany, Austria and other intolerant areas. Quietly, an effective job is being done in refugee rehabilitation, but more thousands are being banished cruelly from their native laboratories because of political, so-called "racial", and religious circumstances. This rescue of scientific brains is important because they hand on the torch of knowledge. Once extinguished the flame is difficult to rekindle.

Even in the scientifically liberal countries there are sometimes anti-science activities, such as the anti-evolution wave in America some years ago, and the perennial antivivisection propaganda.

During the past few years scientists, in the face of increasing limitations upon science's freedom, have been wondering what they can do about it. Can they help to put the world in better order? Can they help capital, labor, management, and government adapt and apply successfully the research riches that science has given civilization? Can they infuse into international affairs generally the spirit that makes all scientists intellectual brothers regardless of nationality?

Big problems, these. Formless, amorphous situations, difficult to grasp. Wordy ideals, hard to nail down to realities.

The national science organizations are beginning to reach out to each other. In 1933 the American Association for the Advancement of Science formally expressed "grave concern over persistent and threatening inroads upon intellectual freedom which have been made in recent times in many parts of the world." In 1936 the British Association was urged to become a forum for the discussion of the impact of science on society. In 1937 the American Association extended to the British Association and like science organizations an invitation "to cooperate in promoting peace among nations and intellectual freedom in order that science may continue to advance and spread more abundantly its benefits to all mankind." The ferment is working.

Notable Declaration

The A. A. A. S. resolution of 1933 framed by Dr. Robert A. Millikan and Prof. Henry Norris Russell is a notable declaration of scientific freedom.

"Our existing liberties," it reads, "have been won through ages of struggle and at enormous cost. If these are lost or seriously impaired there can be no hope of continued progress in science, or justice in government, of international or domestic peace, or even of lasting material well-being.

"We regard the suppression of independent thought and of its free expression as a major crime against civilization itself. Yet oppression of this sort has been inflicted upon investigators, scholars, teachers and professional men in many ways, whether by government action, administrative coercion or extra-legal violence.

"We feel it our duty to denounce all such actions as intolerable forms of tyranny.

"There can be no compromise on this issue, for even the commonwealth of learning cannot endure 'half slave and half free'. By our life and training as scientists and by our heritage as Americans we must stand for freedom."

Conferring at Cambridge

Latest effort to bring scientists of different nations into formal mutual endeavor is the proposed cooperation between the British and American Associations for the Advancement of Science. This is a major topic for the meeting of the British Association now in session at historic Cambridge. An official delegation from the American organization is attending, supported by the presence of additional leading American scientists who like to mingle with their British brothers in science.

This venturing abroad enables great scientific leaders to meet face to face. The institution of international science congresses is well-established. The World War merely interrupted the succession of world conclaves on all sorts of subjects. Most of the world science meetings keep on repeating themselves through international committees, aided by convention-seeking cities and nations. But science has its international government, official in that nations support it and give it sanction. In fact there are in effect two or three international governments, relatively non-conflicting.

There is the International Council of Scientific Unions which binds together specialized international unions, in astronomy, geodesy and geophysics, chemistry, radio, physics, geography and biology. These act as planning boards, arranging joint researches, adopting definitions, standards, etc. There are numerous commissions and committees, with and without governmental sanction that play their world-wide roles. The League of Nations has its International Committee on Intellectual Cooperation with an

institute at Paris. But these organizations are concerned almost solely with technical matters and not so much with the impact of science upon society. The League's health and labor organizations have gathered factual material in some scientific fields. The recent League report on nutrition is an important document whose recommendations will be difficult to put into effect in countries preoccupied with nationalism.

Scientists self-conscious of their effects on the world at large constitute a rather recent phenomenon. There has always been a leaven of professors and doctors who worried about how the world uses the fruits of science. Even more have been concerned with the relatively meager support given to research by an indulgent, charitable or financially shrewd work-a-day world.

Now the cry of "Scientists of the World, Unite!" might be heard if scientists expressed themselves that way. They are tempted to organize for a dual purpose: to save science from intolerance and to apply science to an endangered world.

Search for Defenses

Can they do this? What chance has a scientist or a scientific group when a dictator makes up his mind to misuse some body of accepted fact? Can the scientists of the world get together for their own protection and the preservation of the methods and facts they perpetuate? With the scientific ruination of Germany staring them in the face, it is little wonder that serious thinking is being done.

Can militant defensive tactics be grafted upon the old-line technical organizations, such as the British and American Associations? Or will there need to be a new science society, a World Association for the Support of Science, a scientists' league of nations, whose sole objective will be to defend and support scientific freedom? Or should the scientists, not as research workers but as citizens, throw their lot in with the politically liberal groups that are supporting democracy in the fight against totalitarian doctrines?

Even more basically, should scientists be militant or should they encourage the educative process, trusting that the common-sense of the scientific method will outrun in the public mind the false enticements and the easier promises of the demagogue?

Among the scientists as among men and women in general, in democracies and intolerant countries alike, there are "liberals" and "conservatives." The less radical react to current international situations by wishing to see scientists representing all governments, dictatorships and free countries alike, sit down together to discuss the impact of science upon world affairs. The less conservative throw their lot in with those in violent protest against intolerance and aggression, joining as best they may defensive conflicts for liberty and freedom, whether they be on battlefields in Spain and China or in the quieter battles on the fields of learning and commerce.

Can a scientist's oath, an affirmation of allegiance to scientific ethics, weld the intellectual world into an aggressive bloc against intolerance and dictatorship?

The Hippocratic Oath of more than 2,000 years ago promoted standards among medical practitioners. Oaths of loyalty are required by temporal rulers and nations. The Ten Commandments have long constituted a code of Judaeo-Christian ethics.

The conception of the objective truth basic to all science and human progress, constitutes an unwritten code of conduct, made vivid by the words and acts of the scientists themselves. Some feel that in the present crisis, the world of science needs a definite written oath around which the scientifically minded may rally with pledges and signatures.

Magna Charta of Science

A magna charta of science, or a declaration of scientific independence, has been suggested. It would "proclaim the freedom of research and exchange of knowledge, that science must be international to survive and that science stands for peace and the common good of all mankind." Since the scientific method is the direct opposite of the dogmatic, many scientists shy away from the written oath, feeling that the deed speaks louder than the word. The very essence of the scientific spirit is a matter of change, progress, freedom of thought, truth, tolerance and justice, which are qualities difficult to define in words.

A broadly-worded declaration of scientific principles, containing emotional appeal for intellectual and ethical conduct, might well win support for science's sanity in lay and political circles.

Adherence to such an oath or declaration would be treason in some countries today. There would be suppression of efforts to obtain signatures or organize active support for the scientific tradition of toleration and freedom. It would be considered subversive doctrine.

In more fortunate countries there is a complacent attitude that civilized traditions of science are safe and need no sacrifice or action to maintain them.

A declaration of scientific faith formulated by L. L. Whyte of London has been presented to the scientific world through publication in the British science journal, *Nature*. Signed by enough culture-conscious men and women throughout the world, it might become a rallying point in the growing struggle against the forces of intellectual darkness.

Declaration of Faith

This Declaration of Scientific Faith is as follows:

"I am the inheritor of the tradition of civilization which has proved more lasting than empires. Whenever I use the language or the products of science I unconsciously pay homage to the countless men for whom no sacrifice was too great in the struggle to develop the human mind and establish the truth. Toleration and freedom are the heart of this tradition; for individual thought and love of truth are the basis not only of science, but also of justice and of civilization.

"I declare my loyalty to this tradition, my belief in the freedom of the individual to develop his talents for the enrichment of the community, and my conviction that man's community is now the whole human race, within which each nation must play its characteristic part. The natural balance between personal freedom and the proper demands of society, which is the life and health of civilization, is today doubly threatened: in certain societies by the denial of freedom and in the democratic countries by the irresponsibility of individuals. In the face of this threat:

"I pledge myself to use every opportunity for action to uphold the great tradition of civilization, to protect all those who may suffer for its sake, and to pass it on to the coming generations. I recognize no loyalty greater than that to the task of preserving truth, toleration, and justice in the coming world order."

New international barriers hamper the advancement of knowledge. "Keep Out" signs are posted to bar the inquisitive and questioning mind. Governments impose uniform ideologies and circumscribe in the interests of a dominant regime the area of intellectual liberty. The march of science is stopped at some frontiers, not because the frontiers have any greater geographical significance than they had a few years ago, but because

behind them the search for truth by eager and skeptical minds has been made impossible.

Such are the rather regretful indictments made by President Raymond B. Fosdick of the Rockefeller Foundation in his current annual report.

Areas of Perversion

There are areas upon the earth where science is being perverted and distorted to serve compulsion and repression. Scientists who remain loyal to their principles are forced into exile, disappear into concentration camps for "protective custody" or even die as the result of their pursuit of truth. Books heretical to the current regime are burned or suppressed. Scientists who follow the world tradition of cooperation with their colleagues in other nations disappear and are heard from no longer.

Germany, the birthplace of so much scientific method and tradition, has had its scientific culture ravished by Nazi doctrine and domination. The Nazi "Aryan" race theory is repudiated by all competent biologists and anthropologists. The shocking pogrom directed against the Jews seeks its justification in a new pseudo-anthropology made in Germany.

Thought is regimented also in Italy under Mussolini, with non-conforming scientists eliminated. In Soviet Russia, where science of the Marxian brand has become almost a religion, there is little tolerance for non-conforming ideas or for science that does not serve the state.

In all three of these dictatorships, the kind of science that can be applied to war preparation, to production of substitutes for raw materials these nations lack, to material things that make the nation more "self-contained," is cherished and cultivated as a farmer cares for a productive cow. To be sure, in democratic countries this is also the custom.

In the U. S. S. R. scientists see in the doctrine of dialectical materialism, the philosophical basis of Marxism, an explanation of natural law as useful in pursuing scientific knowledge as building a social order. And contrary to the Nazi dogma, the U. S. S. R. practices a theory of racial equality.

All science under a dictatorship is not completely suspect. For example, competent observers find psychology, medicine and some other applied branches of science richly supported in Soviet Russia. German organic chemistry is still productive.

Abuse of Epithets

If it were not so tragic it might be possible to find humor in the way in which the epithet "dogmatic" is applied to anti-Nazi scientists by the Nazis. For example, Prof. J. Stark, Nobelist in physics in 1919 and now under Hitler president of Germany's Physikalisch-Technische Reichsanstalt, holds that "natural inclination to dogmatic thought appears with especial frequency in people of Jewish origin" and that "the predisposition towards pragmatic thinking occurs most frequently in men of the Nordic race."

The rampant nationalism evident in sorely pressed countries today is counter to the slow, centuries-old growth of the scientific tradition of universal truth and world knowledge. This regression to nationalism and the subjection of intellect to political expediency must not be allowed to prevail.

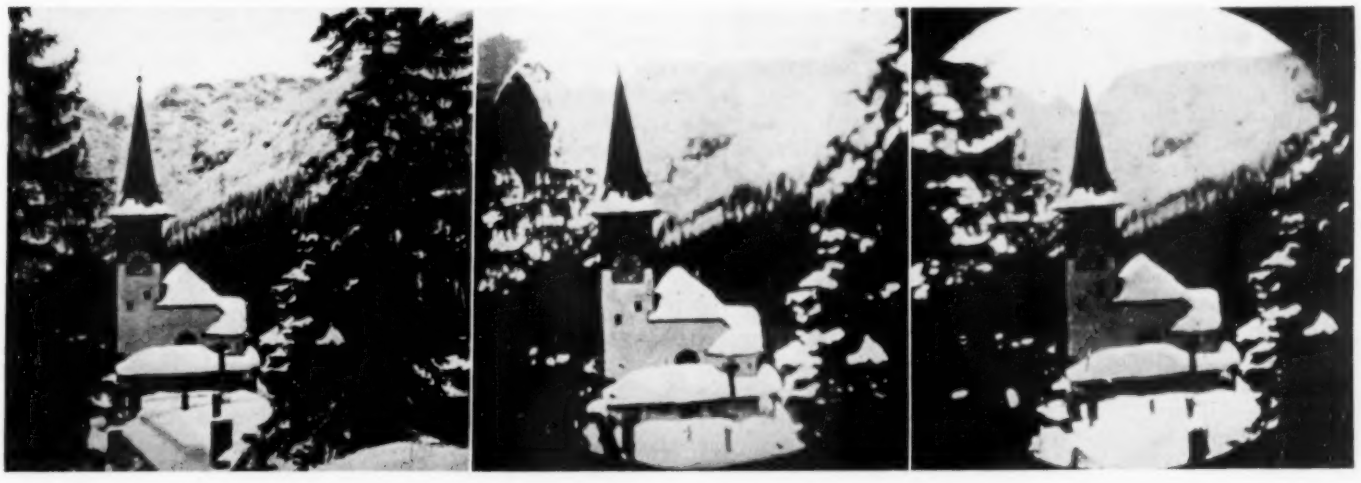
To quote President Fosdick:

"In the last analysis knowledge cannot be nationalized. No successful embargoes can be maintained against the export or import of ideas. Whether new conceptions in atomic physics come from Copenhagen or from Cambridge, England; whether the cure for cancer is developed in New Haven or in Berlin; whether it is a Russian or an Italian or an American who takes the next step forward in mankind's struggle with virus diseases—we are all of us, under whatever flag, the joint beneficiaries of the intellectual property of the race. In all the clash of competing nationalisms there is here an underlying principle of unity: the single aim and language of science in the discovery of truth. It is this principle which challenges the twentieth century with the conception of civilization as a cooperative achievement and with the ideal of intellectual capital as an international possession."

The infringement of scientific and intellectual freedom and the intolerant and oppressive nationalism rampant in large areas of the world today are little short of an undeclared war. Because the machine guns do not rattle and the bombers do not drop their deadly eggs, this war on science is largely unheralded. But is is destructive none the less. In the wake of actual warfare, which promises to follow abuses of truth and nationalistic propa- (*Turn to Page 126*)

ELECTRON PHOTOGRAPHY

Streams of electrons focussed by means of magnets, instead of beams of light focussed with lenses, can now be used for making photographs. Although the new electron cameras are commonly used in the laboratory for microphotography, ordinary outdoor scenes can also be photographed with them. At left is a village photographed with a conventional camera. In center, the same scene taken with an electron camera using a long solenoid to focus the electrons. At right, the same scene with another electron camera using permanent magnet as the focussing means.



PHYSIOLOGY

Male Rats Partly Turned Into Females Before Birth

SEX CONTROL, the pre-birth determination whether the expected offspring shall be male or female, has been partially accomplished with young rats by Drs. R. R. Greene, M. W. Burrill, and A. C. Ivy of Northwestern University Medical School.

They report (*Science*, Aug. 5) that after injecting heavy doses of a female sex hormone, estradione, into pregnant rats, young male animals were born that were partly feminized; that is, certain of their masculine characters were underdeveloped, while female sex organs appeared in some of the animals. Female animals in the same litters had sex organs in an exaggerated state of development.

Previous experiments in the same laboratory had produced partially masculinized female rats by similar treatment of their mothers with male sex hormone injections.

Science News Letter, August 20, 1938

PSYCHOLOGY—ENGINEERING

Car of Tomorrow Pictured By Student of Driver-Mind

A GLASS-enclosed car, with engine in the rear, an emergency exit for use in case of overturn, and a governor-controlled light to blaze a warning when speeds are excessive—those are some of the specifications of the car of tomorrow as visioned by psychologists.

The automobile of the future has often been pictured by the engineer, who has listed possible improvements leading to technical perfection.

But behind tomorrow's wheel will sit essentially the same old driver with all his mental quirks, his faults, and his human weaknesses. So tomorrow's car must be fashioned to fit the psychology of driver.

Such a car is described by Dr. Herbert A. Toops, of Ohio State University, he of trade test and intelligence test fame, and Dr. S. Edson Haven, of Wayne University, Detroit. These scientists are the authors of a new book, *Psychology and the Motorist*.

The controls of a car should respond as quickly and as readily for the weak person as for the strong, they state.

Retractable running boards and door handles would eliminate many occasions for serious injury.

Greater areas of glass would not only increase visibility, but would remove the false sense of security of today's driver within his steel stronghold. For the same reason removal of the motor from the front of the car might increase caution.

Lights in the body top, to make the car visible sooner when going over the top of a hill, a warning light automatically turned on when the speed is increased beyond the danger point, and finger-tip replacement of fuses and headlight bulbs are other safety features recommended.

Bright dash lights are condemned because of a tendency to attract the eyes, drawing them from the road or fatiguing the eye muscles and nerves and inducing sleep.

Science News Letter, August 20, 1938

PHYSICS

Cosmic Ray Balloons Returned in Record Time

TEN SELF-recording electroscopes sent aloft by Dr. Robert A. Millikan and Dr. H. Victor Neher, noted California Institute of Technology physicists, have been returned to Pasadena, setting a new record for speedy recovery of instruments. All were back home within a month after the first was released.

Each instrument was carried aloft by a tandem of 10 balloons, the highest going to 85,000 feet, with 40,000 the minimum altitude reached.

Most of the instruments went to an altitude in excess of 65,000 feet.

Each of the instruments returned brought the finder a $5 reward.

One woman in North Dakota reported that as she sought to untangle the instrument and parachute by which it descended to the earth one of the balloons which had not burst exploded almost in her face. Her only concern, however, was her anxiety over the safety of the scientific instrument.

The instruments were sent aloft by the scientists in their campaign to secure more accurate determinations of how cosmic radiation varies with latitude.

Six cosmic ray electroscopes were released at Bismarck and four at Oklahoma City. They were sent aloft during the last week of June and first two weeks of July. Before Dr. Neher had released the last balloon at Bismarck the first instrument sent aloft had been returned to him.

Each flight provided California Institute of Technology researchers with approximately one foot of motion picture film recordings of cosmic ray activity at various elevations, in their campaign to secure information on the latitude effect.

Science News Letter, August 20, 1938

IN SCIENC

AERONAUTICS

Polish Stratosphere Flight Planned During September

THE LARGEST manned, free balloon ever to be launched will make an ascension into the stratosphere next month, according to plans now being formulated in Poland.

A valley in southwestern Poland, near the Czechoslovakian border, will be the scene of take-off of the aerial giant. Captain Zbigniew Burzynski and Capt. F. R. Hynek, both of the Polish army, and Dr. Yodko Narkiewicz, Polish explorer and alpinist, will comprise the stratosphere party.

The Polish balloon will be made of rubberized silk. It will weigh only a little over half as much as the bag of the Explorer II of the National Geographic-Army ascension in 1935.

The volume of the Polish bag will be more than 4,800,000 cubic feet as against 3,700,000 cubic feet for the Explorer II. Its height at take-off will be 459 feet, compared with 315 feet for the American balloon, and its greatest diameter will be 209 feet as against 192 for the Explorer II.

Its greater volume and lighter weight give the Polish balloon a potential ceiling of 81,000 feet as contrasted with the world record of 72,395 feet made by Explorer II.

Science News Letter, August 20, 1938

ASTRONOMY

Sunspots Brought Indoors At Hayden Planetarium

See Front Cover

SUNSPOT numbers are diminishing now, astronomers report, but there are still enough of them (there almost always are) to make observations interesting. Sunspot studies are made easier for the public at the Hayden Planetarium in New York City, where the staff astronomers have designed what they call a solar periscope, which brings the sun indoors and projects its immense image on the dome. The spots, barely visible on ordinary low-magnification images of the sun, show up as much as two feet across.

Science News Letter, August 20, 1938

NCE FIELDS

PLANT PHYSIOLOGY

Evaporation From Leaves Helps Keep Plants Cool

WATER cooling, used in practically all automobiles and many airplanes, is an age-old story to leaves. They make use of the principle to keep their temperatures down when the blazing summer sun shines on them, according to evidence produced in experiments by Dr. Raymond H. Wallace of Connecticut State College, Storrs, Conn., and Dr. Harold H. Clum of Hunter College, New York City.

The role of the great amounts of water evaporated by leaves has long been a moot point with plant scientists. Drs. Wallace and Clum have been able to demonstrate, through the use of a new and highly sensitive type of thermocouple designed especially for this kind of research, that leaf temperatures are 15 to 20 degrees Fahrenheit cooler when they can evaporate water freely than they are when this transpiration loss is prevented by waxing their surfaces.

Science News Letter, August 20, 1938

PSYCHIATRY

Ex-Mental Patients Form Own Alumni Organization

VETERANS' organizations have played an important part in rehabilitating the participants of those disorders of the social order that are known as wars. Alumni associations are useful institutions in our educational life.

But today's most unusual organization of a similar sort is the Association of Former Patients of the Psychiatric Institute of the University of Illinois and the State Department of Public Welfare. This alumni association of the veterans of mental illness has its own publication, appropriately entitled *Lost and Found*. Vol. 1 No. 1, just issued, tells why former patients of a mental disease hospital wished to organize and how their association functioned during its first half year.

The success of the "shock" treatments for mental disease, heroic brain-shaking doses of insulin and metrazol, increased the ranks of recovered patients so markedly that both physicians and former patients found it useful to meet together regularly. Dr. A. A. Low, assistant director of the Illinois Psychiatric Institute, is president of the association, which admits physicians on an equal footing with the former patients.

Discharged patients are confronted with the stigma of having been in a mental hospital and the discrimination against those unfortunate enough to have suffered mental illness. The "alumni" are striving to remedy this condition just as Clifford Beers, the "mind that found itself", organized the mental hygiene movement that is now worldwide.

Uppermost in pages of this unique journal *Lost and Found* is the idea "things have changed". Never before had recovered mental patients come back to the hospital, not because they were required to do so but because they were invited. Never before had ex-patients themselves told the world about the changed conditions and the new hope for the mentally ill.

Science News Letter, August 20, 1938

BIOLOGY

Plant and Animal Cells Form Strange Partnership

PLANT and animal cells, that have never been acquainted in all the long course of evolutionary history, are able to form a mutually beneficial partnership, it is shown in experiments carried out by Dr. Ralph Buchsbaum of the University of Chicago.

The animal cells were those of chick embryo tissues, kept alive and growing in glass vessels by the technique developed and made famous by Dr. Alexis Carrel of the Rockefeller Institute. The plant cells were tiny one-celled green spheres found in stagnant water, known to botanists as *Chlorella*.

When *Chlorella* cells were mixed with the chick tissue cells and kept lighted and warm, both kinds throve much better than comparison cultures in which the cells were kept separately. The plant cells were greener and healthier-looking, the animal cells multiplied faster and did not grow old and die so soon.

It is believed that the plant cells benefited by using waste products of the animal cells' life activities as food. It is significant in this connection that when the cell mixtures were kept in the dark, so that the green plants could not absorb the carbon dioxide, most of the benefits of the association were lost. The partnership is good only in the light.

Science News Letter, August 20, 1938

ETHNOLOGY

Fear Drives Ainu Women To Strange Behavior

THE HAPPY savage is not so happy, after all.

Jean Jacques Rousseau gave the world a rosy picture of primitive life. And ever since, the popular notion has persisted that primitive man has no fears and worries. At least, none worth mentioning in the same breath with the city dweller's harassed nerves.

But scientists are finding that primitive man and his wife do fret. Get close enough to some native group, and you may find ugly mental and nervous disorders preying on individuals.

What particularly interests the psychiatrist is that a primitive group has its own peculiar forms of mental and nervous abnormality.

A curious fear reaction that besets the Ainu race has been studied lately by three Japanese psychiatrists. It appears that snakes can drive some Ainu women into a jitter that makes feminine agitation over a mouse look like nothing.

Out of 17,500 Ainus, who inhabit Japan's most northerly islands, 111 women were found suffering from abnormal susceptibility to fear. Over half owed their condition to some fright over a snake, in the past.

Whatever caused the trouble—fright at a snake, frog, or other creature—the same object would at any time cause the victim to go through a routine of queer behavior. Even mentioning a serpent was enough to start an attack in some women. The terrified Ainu would grow hysterical, fall into a cataleptic fit, reduced for several minutes to automatic and abnormal behavior.

Science News Letter, August 20, 1938

BACTERIOLOGY

Bacteria in Frozen Mammoth to be Studied

BACTERIA in the trunk, mouth, digestive tract, and other parts of the frozen mammoth carcass recently found on Wrangel Island in the Arctic will be studied by Prof. Karapetev of the Soviet Academy of Sciences as soon as the great beast has been brought to Vladivostok.

Prof. Karapetev believes he can revive the microorganisms, and also parasites frozen upon the exterior of the body, as he has revived lower plant and animal forms found in the permanently frozen soil of Siberia.

Science News Letter, August 20, 1938

SOCIOLOGY

Marriage Rate, Business Trend, Found to Be Closely Parallel

Modern Youths Quicker to Take Advantage of Economic Recoveries Than Their Grandfathers Were, Study Shows

SWEET romance and its aftermath, marriage, have a business-like basis in that the number of marriages in the United States closely follows the trend of business conditions, a study by statisticians of the Metropolitan Life Insurance Company reveals.

Marriages have closely followed the curve of business failures and prosperity since 1868, going down with hard times and up with good, a graph prepared by the company shows.

Based on a study of marriage rates in New York City, Connecticut, Massachusetts, Michigan and Rhode Island, the chart reveals extremely close correspondence between the number of bankruptcies and marriages, particularly in recent years.

Years of Depression

The curve of marriages indicates that 1878, 1884, 1893, 1896, 1907-8, 1921-2 and 1932 were years of black depression for the United States, a fact confirmed by reference to business charts.

Marriages did not follow the trend of business conditions at only one time during the 67-year period covered by the survey. The year 1918 was a poor year for Cupid but a special factor, American participation in the World War and the universal draft, acted to draw off a large number of eligible young males from participation in civil life.

"Upon reflection," it is remarked in the survey, "it is rather natural that there should be close relation between the marriage rate and business conditions. For not only will young people be restrained from marrying in times of economic stress, either through prudence or through actual necessity; but there results in depression years an accumulation of marriageable men and women who form a reservoir from which, in the following years of improved business, an additional batch of marriages ensues. To some extent this argument applies to other social reactions to varying business conditions also, but it is probably more definite and more marked in the case of marriages."

A one- or two-year lag between marriage and bankruptcy occurred in the earlier part of the period covered in the study, but this lag has tended to disappear in recent years.

"Wait Three Years"

Love at first sight may be successful enough in fiction, but in real life it is more likely to be an unhappy marriage that follows a precipitate wedding. This is revealed by figures from the Institute of Family Relations in Los Angeles reported in *Social Forces*.

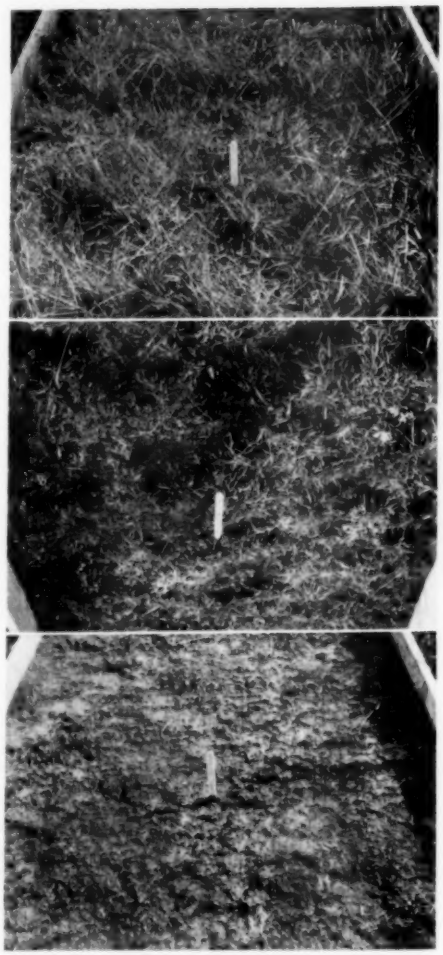
Wait two years before engagement and another year before marriage, is the advice that might be gleaned from the report by Dr. Paul Popenoe, director of the Institute, and Miss Donna Wicks Neptune, who have studied 374 unhappy couples as compared with 436 having "run-of-the-mill" happiness.

The unhappy couples knew each other for an average of 20 months before engagement and then were engaged for about seven and a half months. The other couples waited longer. They were acquainted for 28 months before engagement and for more than a year of betrothal before marriage. Nearly 20 per cent. were acquainted for more than five years before they became engaged.

Married in Haste

Marriages on the spur of the moment "without any engagement" occurred eight times as often among the unhappy couples as among those that turned out better. These were not "marriage at sight" for the couples had known each other for a year or two and then suddenly made up their minds to marry. Perhaps the reason was instability, perhaps coercion. At any rate they turned out badly, the investigators report. There were 140 of the unhappy couples in this "no engagement" group.

Five of the unhappy couples report "love at first sight," for these had no period of acquaintance before engagement. But they waited then for one month to 11 months before marrying.



GOING, GOING, GONE!

A vivid lesson in soil erosion is afforded by three comparison plots of prairie grassland studied by Prof. J. E. Weaver of the University of Nebraska. The middle plot was partly denuded, the lower one completely so, by over-grazing and trampling. Then all three were exposed to attack by water, in the same intensity. The pictures tell their own story.

ASTRONOMY

Declares Dust in Space Composed of Metal Bits

VAST clouds of dark matter in interstellar space, that obscure some stars and redden the light of others, are composed largely of iron and aluminum, is the conclusion of Dr. B. Stiker, of Bonn University observatory. He estimates the diameter of particles as averaging one ten-thousandth of a millimeter, or one two-hundred-thousandth of an inch.

Dr. Sticker agrees with astronomers in the United States in the opinion that this dark, "unorganized" matter in space makes up a very considerable fraction of the material universe.

MEDICINE

Appendicitis Deaths or Laxative Slaughters

TOO MANY persons are dying of appendicitis, in spite of campaigns to reduce this mortality and in spite of a quite recent downward trend in the mortality. This opinion, held by many authorities, is reaffirmed in a statement from the New York State Department of Health.

Appendicitis ought to be, as Dr. Reginald Fitz of Boston points out, "a disease easily diagnosed, of no great danger, and when recognized early and submitted to proper treatment, readily amenable to cure."

Improper use of laxatives and delay in removing the inflamed appendix seem to be the chief factors that keep the appendicitis death rate up. On the laxative subject, Dr. J. O. Bower of Philadelphia is authority for the statement that between 1918 and 1935 "248,000 . . . have been literally slaughtered with laxatives."

Dr. Fitz cited figures from Peter Bent Brigham Hospital in Boston showing that of 65 patients who died of appendicitis, 74 per cent. had taken some sort of cathartic before entering the hospital, whereas of 100 patients who recovered, only 51 per cent. had taken a laxative.

The same cases also showed the effect of delay in having the appendix removed. None of the patients who died was operated on within 12 hours and only 11 per cent. within 24 hours of the onset of acute abdominal pain or belly-ache. Of the patients who recovered, 8 per cent. were operated on within 12 hours and 25 per cent. within 48 hours of the onset of pain.

If the abdominal pain or belly-ache lasts over four hours it is probably serious. Authoritative advice in such cases is: Call a doctor, do not eat or drink, do not take laxatives or cathartics.

Sometimes appendicitis follows a blow on the abdomen. Doctors are not agreed whether in such cases the blow was the sole cause or whether it precipitated an attack in a previously inflamed appendix. The important point is that such cases of appendicitis are unusually severe and demand immediate surgical attention.

Science News Letter, August 20, 1938

CHEMISTRY

Accidents Have Played Part in Discoveries

WHILE there is no substitute for clear thinking, impartial observation and clever experimentation in scientific and technical research there is an element of good fortune which, at times, must receive credit for great discoveries.

Goodyear's classic accident of dropping rubber and sulfur on a hot stove and thus discovering the process of vulcanization is well known, of course. Not so well known, but equally important, was the accident that happened at the pioneer rayon plant of Count Chardonnet.

This French founder of the modern rayon industry produced rayon by dissolving nitro-cotton in ether-alcohol and pressing this viscous mass out through capillary tubes into water where it coagulated into filaments. One day the water supply failed and before workmen could stop the equipment the viscous material came out into dry air. Surprisingly, the results were better than before and the whole method of dry spinning, as it is called, came into being.

By accident too was discovered the so-called flints of cigarette lighters, consisting of cerium-iron alloy. The Austrian scientist Auer von Welsbach had found that when thorium oxide was heated it glowed brightly, a discovery which led to the creation of the Welsbach gas mantle. Actually Welsbach found that 99 per cent. thorium oxide and one per cent. cerium oxide gave best results.

The thorium was obtained from monazite sand. In the extraction process cerium residue remained. Seeking to refine the cerium, Welsbach deposited it on iron by electrolysis. While attempting to clean these iron cathodes with his knife Welsbach created brilliant sparks.

Science News Letter, August 20, 1938

PHYSIOLOGY

Fats Give More Energy, Greater "Staying" Quality

MOST persons do not need to be told to eat fat. They like the flavor and they have probably learned from experience that a meal with fat in it has more "staying" power than a meal without. So, more or less automatically, butter is spread on bread, oil is put in salad dressings, cream goes in coffee and bacon is eaten with eggs.

The scientific reasons for eating fat and some of the newer knowledge about fat are less well-known but interesting. For example, the reason why you feel hungry sooner after eating a meal with little fat than after a meal with lots of fat is because fat leaves the stomach more slowly than protein foods or starches and sugars. Moreover, fat eaten with these other kinds of foods—bread and butter or bacon and eggs—retards the digestion of the other food substances.

More Fuel Elements

Besides adding to the feeling of satisfaction after a meal, fat is the best of all foods for giving energy. Weight for weight, the fats give more energy than either proteins, such as meat, or carbohydrates, such as bread, cereal and potatoes. The reason for this is that fats contain a higher proportion of carbon and hydrogen, they are relatively drier than the carbohydrates and proteins as ordinarily eaten, and fats are more completely digestible than the other classes of foods so that there is almost no waste.

You can get along with very little fat. An experiment has been reported in which a man lived for six months on a diet containing only two grams of fat per day. Two grams is equivalent to about seven-hundredths of an ounce —a mighty small speck of butter. Surprisingly, this man felt no fatigue. The rest of his diet, however, was very carefully planned. An ordinary fat-lacking diet, such as was eaten in European countries during the World War, results in premature hunger, lowered energy and reduced capacity to work.

The average adult should eat about one-third of his daily calories as fat. Margarines or processed vegetable fats give better value for the money than butter, but ordinarily lack the vitamins A and D which butter supplies.

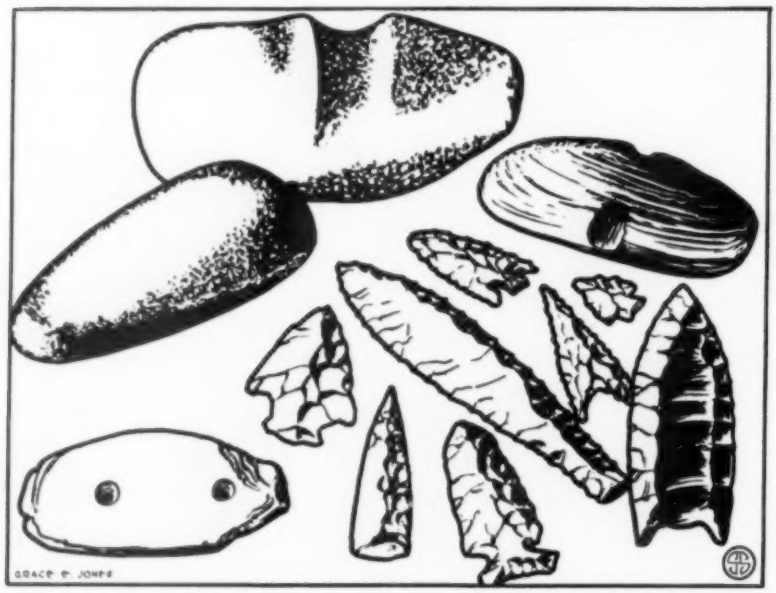
Science News Letter, August 20, 1938

America got its house mice originally from Spain.

Inexpensive Summer Fun

Indian Arrow Points Are Interesting to Hunt

(Tenth of a series of 12 articles. Next week—Wild Fruits and Seeds.)



MANY KINDS OF RELICS

Indians made many things out of stone besides arrow and spear points. Included in the above illustration are a grooved ax, an ungrooved celt, a banner-stone (upper right) and a neck ornament known as a gorget (lower left). Rarest prize of all is the grooved point shown at lower right: a 10,000-year-old Folsom dart point.

INDIAN arrow points have always been favorite objects of collectors. There used to be more of them than there are now—indeed, in pioneer days there were often far too many of them, which their red-skinned owners were much too anxious to bestow upon their undesired new neighbors. But the Indians are gone now, from most of the land; only their relics remain, to be sought for by hopeful collectors, and perhaps found by the lucky ones.

Best way to hunt for arrow points and other things the Indians made is to walk slowly over recently cultivated earth, especially a few hours after a rain, keeping your eyes carefully on the ground. Every time you see a bit of sharp-edged stone projecting, pick it up. Not often will an arrow point be lying loose upon the surface. Much more frequently only an edge or a corner will be sticking out of the soil.

Of course, more than 99 times in a hundred your sharp-edged bit of stone will prove to be just that and nothing more. But once in a while you will be rewarded with the thrill that only a fortunate find can give. Do not despise your treasure if it happens to have a bit knocked off its tip or lacks a corner. You will find dozens of imperfect specimens for every perfect one.

Arrow points are by far the commonest kind of Indian relics you are likely to find. Arrows are shot at game, or loosed in battle, and may thus be lost. Or they may strike the quarry, merely wound it, and be carried away. Only after the animal dies does the decay of its body release the bit of stone to lie in the earth.

Yet by more than ordinary good fortune you may find other things the Indians made: the larger points of darts or spears, the grooved stone head of a tomahawk, an ungrooved ax-like tool known as a celt, ornaments of various kinds. Rarest prize of all is a "banner stone"—a symmetrically formed, oblong, elliptical, or even butterfly-shaped piece of polished stone with a hole bored through it crosswise. Nobody knows what these pieces were actually used for, but their apparent uselessness as tools or weapons, and the position of the small hole, hint that they were carried on the ends of ceremonial wands or staffs.

Since these Indian weapons and tools are usually made of flint, jasper, or other hard stone, you don't need to take too great precautions with your collection. They may be kept loose in a box or drawer, so long as you don't mix big pieces and little too indiscriminately. That might damage the smaller pieces. Or, if you want to make a more easily examined exhibit, use a piece of wallboard, piercing holes on opposite sides of your arrow spear points and fastening them down securely with fishline or thin copper wire.

However or wherever you may go collecting, *don't dig*. Indian mounds, or other places that are supposed to be Indian graveyards, are always tempting. But they are so rare, and the secrets they hold are so valuable, that only expert scientists should ever stick a spade into them. Stories of treasures of gold and pearls hidden under Indian mounds are invariably false: mounds *never* contain anything you can sell for enough money to pay for the labor of digging. So it's better to let them alone.

For more information about collecting Indian relics and a list of books and pamphlets on the subject, send us a postcard with your name and address. Ask for Bulletin 10. Address Science News Letter, 2101 Constitution Ave., Washington, D. C.

Science News Letter, August 20, 1938

ART

Restore Old Paintings—With Science and Taste

IT IS PROPER to restore old paintings —provided this is done with science and taste.

This, in effect, is the verdict of Sir Kenneth Clark, director of Great Britain's National Gallery. He has come out for the policy of restoring old masters, whenever possible, to their original brightness and charm. Many canvases in the National Gallery are emerging from behind seven veils of "protective" varnish. One cleaning job has given England a new Velasquez, for dirt and repaint had hidden a Valasquez portrait of King Philip long rated as a lost work.

Sir Kenneth is well aware that resto-

ration is controversial, and has many vandal acts to its discredit.

"Until quite recently," he says, "the pictures in big country houses were periodically handed over to the house carpenter to brighten up as best he could."

The carpenter usually added a harmless coat of varnish, or a shiny coat of oil, which turned the painting black later. Or, given time and reserve energy, he would scrub at dirt and thick varnish with disastrous results. Professional restorers followed much the same tactics.

Until the mid-nineteenth century, it seems, the public admired dark brown pictures, by the confused reasoning that good paintings were often dark and therefore dark paintings were good. This thought enabled restorers to cover many a disaster by a coat of what Sir Kenneth derisively calls brown sauce.

Then, taste swung to light pink pictures, and one dealer kept a restorer busy giving ladies rosebud mouths. That fad, too, is over.

Now, with X-rays and infra-red rays, restoring is more enlightened work, literally. With these scientific aids, there is less excuse for false experiments. And a gallery director can more confidently decide what Sir Kenneth considers the big question: "Will the picture look more beautiful restored or unrestored?"

Science News Letter, August 20, 1938

ECOLOGY

Rays Influence Antlers, Austrian Studies Show

ULTRAVIOLET rays, known to have great influence in bone formation, appear to be as influential in the growth of deer's antlers, from the researches of Prof. N. Schuhmacher of the University of Innsbruck. Prof. Schuhmacher found that the antler growth of deer in the Austrian Alps was greatest in years showing the largest number of sunny days and average temperatures above normal.

Science News Letter, August 20, 1938

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PUBLIC HEALTH

Cities' Health Honor Roll Shows Low Diphtheria Rates

TWENTY cities are cited for praise by the American Medical Association in its annual survey of deaths from diphtheria.

These twenty had not a single death from diphtheria during 1937. Nine of them had no fatalities from this disease in the last two years. Ten of them have had neither diphtheria nor typhoid deaths.

Against the praiseworthy twenty are set nine cities with a record much less proud. These are cities in which diphtheria's toll has been heaviest.

The honor roll cities for 1937, as listed by the American Medical Association, are:

Bridgeport, Conn.; Cambridge, Mass.; Des Moines, Iowa; Duluth, Minn.; Elizabeth, N. J.; Erie, Pa.; Hartford, Conn.; Long Beach, Calif.; Lowell, Mass.; Lynn, Mass.; Omaha, Neb.; Reading, Pa.; Rochester, N. Y.; Somerville, Mass.; Spokane, Wash.; Springfield, Mass.; Trenton, N. J.; Utica, N. Y.; Wichita, Kan.; Worcester, Mass.

Of these, Bridgeport, Duluth, Long Beach, Lynn, Reading, Rochester, Somerville, Spokane, Utica and Wichita had no deaths from typhoid fever during the same period.

Utica has had no deaths from diphtheria in four years. Erie and Rochester have had none in three years.

At the unenviable end of the rating scale come the nine cities with the highest diphtheria death rate for 1937. These are:

Atlanta, Ga.; Birmingham, Ala.; Dallas, Tex.; Fall River, Mass.; Fort Worth, Tex.; Waterbury, Conn.; Evansville, Ind.; Knoxville, Tenn.; El Paso, Tex.

The A.M.A. has made fifteen annual reports of diphtheria mortality in the large cities of the United States. Since 1923, the first year, there has been a drop in the death rate of 13.13 per hundred thousand.

"It is evident that the various elements of the diphtheria prevention program have been extraordinarily effective," the Journal states editorially.

Science News Letter, August 20, 1938

PHYSICS

Northern Lights Not Noisy, Veteran Physicist Declares

NORTHERN Lights do not cause the rustling or swishing sounds frequently attributed to them, declares Dr. A. S. Eve, professor emeritus of McGill University and now resident in London, in a new publication of the Smithsonian Institution. It is physically impossible for them to make sound, he explains, because the 60-mile-high atmosphere where they surge and flare is so rare as to be a fairly high vacuum, and sounds can not exist or travel in a vacuum.

The noises heard and reported by many aurora observers, Dr. Eve suggests, are more probably due to electrical disturbances such as brush discharges occurring on the earth's surface near the observers, who fail to notice them because the Northern Lights are absorbing all their attention.

Science News Letter, August 20, 1938

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From Page 119

ganda with horrible inevitability, scientific work cannot continue.

Scientists are devising means of counterbalancing these dangers of intellectual suppression. A world organization of scientists to give militant attention to social problems is one possibility.

A more conscious effort through the mechanism of education, in school and out, is another possibility. A "world brain" taking the form of a world encyclopedia as suggested by H. G. Wells would provide the "Bible" of this movement, supplemented by the whole of the vast scientific literature.

How to carry this or any other method of scientific propaganda into the countries of censorship, suppression of freedom of speech and press, and concentration is another matter. A rising generation reared in ignorance of the long history of science, the centuries of struggle to attain the present state of our knowledge, may be difficult to reach when the artificial barriers of isolation are lowered.

Parent of Democracy

Democracy is the child of science. Without the growth of rational intelligence, government by and in the interest of the common man would not have been possible. The facts and method of science must be known to all the people. In part this is the task of the schools but to a larger extent it is the duty of the press. In recent years newspapers have conscientiously reported and interpreted scientific advances in order that all may know and understand.

Making the world safe for science will make the world safe for democracy, a task at which warfare was a failure.

In this great undertaking all kinds of science must participate, not just the physics, chemistry, biology, medicine, etc. of the so-called "physical and natural sciences." It is a concern of economics, sociology, engineering, psychology, anthropology, the so-called social and applied sciences. Scientists who do not often meet must work together.

If the great scientific "push" is to be successful there will need to be more and freer discussion than has been traditional. Whether the new science movement takes the form of a great intellectual brotherhood, a new political party, or an infiltration into existing progressive movements, it must be articulate, self-assertive and combative within the limits of the scientific method. It must become a crusade with truth as its only dogma.

If science is to rescue the society it has created, and if the world at large is to preserve in freedom and tolerance the intellectual urge that gives it continual rebirth, there must be some mechanism, whether organized or not, that makes this possible.

The world of science has been one of the most successful of the loosely organized activities on this planet. It is rooted in the idea of free exchange of experiences and experiment, freedom to draw conclusions, test them, discard them if necessary, theorize and test again.

A gigantic flow of literature, books, journals, proceedings, in a medley of languages records and distributes the results of science. There are some 30,000 regularly issued periodicals in the fields of science alone.

In a tolerant world this mechanism of distribution, plus educational efforts, is sufficient. When the free flow of distribution is impeded, the situation becomes dangerous. This is what has happened in recent years in the intolerant areas.

Nuclei of the new science crusade already exist as groups within existing intellectual organizations. They could coalesce into larger units, either bringing together the same brand of scientists from different countries or all scientists of each country. Add to them millions of scientifically-minded laymen, fuse the various units and there would be a new international organization of mankind capable of making the world rational and worth living in.

Science News Letter, August 20, 1938

DEMOGRAPHY

Seeks Geographic Clue To America's Notables

WHAT kind of background produces the most notables?

This question intrigues Americans. It is a familiar saying that "Most famous Americans are born on farms." Wealth and leadership go together, it is also claimed. Another theory is that level lands yield, not only crops, but leaders.

Now, Indiana University's professor of geography, Dr. Stephen S. Visher, has gathered statistics on thousands of Americans who have made good. His facts and figures provide new ammunition for the old argument as to how geography and fame are related. And, as Prof. Visher points out, despite sarcastic remarks about brain trusters, every one knows that experts and other leaders play a large role in our country.

His findings include:

1. Neither rugged nor flat country can justly claim special significance in producing notable Americans.

2. Present day notables come from a peculiar concentration of birth places. New England has produced about twice as many, in proportion to population, as middle Atlantic or north central states, nearly three times as many as Pacific states, and about six times as many as south central states.

3. Despite all this, New England has fallen off lamentably in its proportion of notables. New York and other seaboard states are also slipping. Meanwhile, north central states and the west are raising more leaders.

4. States that stand out as producing one kind of leader—scientists, for example—also produce many noted artists, executives, and professional men.

Many other points can be made from Dr. Visher's study. He closes:

"Areas yield most notables which contain most mentally alert, ambitious, persistent, energetic people, possessed of high ideals. Such people seek opportunities to use their abilities; they appreciate congenial associates and therefore congregate in desirable towns and in choice residential districts or suburbs of cities."

Science News Letter, August 20, 1938

• Radio

Every Friday at 7:30 p. m. EDT, 6:30 p. m. EST, 5:30 p. m. CST, 4:30 p. m. MST, or 3:30 p. m. PST, Science Service cooperates with the Columbia Broadcasting System in presenting over the Columbia coast to coast network a new series of "Adventures in Science" presenting dramatizations of important scientific advances and discussions by eminent scientists.

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Additional Reviews On Page 128

Zoology

ANIMAL NEIGHBORS OF THE COUNTRYSIDE—Joseph Wharton Lippincott; illus. by Lynn Bogue Hunt—*Lippincott,* 272 p., $2.50. Delightfully chatty little adventures with native animal folk of all kinds, ranging from bobwhites to skunks. Even the "bad" ones, like crows, are made to appear as most interesting neighbors. In addition to affording fascinating reading, it should stimulate you to go and do in like manner.

Science News Letter, August 20, 1938

Geology

YELLOWSTONE THROUGH THE AGES—Arthur D. Howard—*Columbia Univ. Press,* 64 p., illus., 50c. An imaginatively written popular geological history of the Yellowstone region, with several excellent photographic illustrations. Short enough to read quickly, thin enough to slip into a coat pocket, this pamphlet will form a most desirable traveling companion on a National Parks tour.

Science News Letter, August 20, 1938

Botany

A TEXTBOOK OF GENERAL BOTANY FOR COLLEGES AND UNIVERSITIES (4th ed.)—Richard M. Holman and Wilfred W. Robbins—*Wiley,* 664 p., illus., $4. One of the most successful of modern botany texts, with extensive revisions, particularly to keep up with the rapid progress of research on absorption, translocation, and other physiological phenomena.

Science News Letter, August 20, 1938

Botany

A LABORATORY GUIDE FOR A COURSE IN GENERAL BOTANY (4th ed.)—Lee Bonar, Lucile Roush, and Richard M. Holman—*Wiley,* 110 p., $1.25. For use with the foregoing, or may be adapted to courses in which other texts are used.

Science News Letter, August 20, 1938

Forestry—Engineering

MECHANICAL PROPERTIES OF CERTAIN TROPICAL WOODS, CHIEFLY FROM SOUTH AMERICA—William Kynoch and Newell A. Norton—*Univ. of Michigan Press,* 87 p. 25 c. With imported timbers, of kinds hitherto but little used, playing an increasing part in construction, this discussion of a series of tests will undoubtedly be welcomed by builders.

Science News Letter, August 20, 1938

Mathematics

CLEAR THINKING; AN APPROACH THROUGH PLANE GEOMETRY—Leroy H. Schnell and Mildred Crawford—*Harper,* 442 p., $1.60. It should be a stimulating experience for a pupil to come upon this text when confronted with a plane geometry course. The early portion of the text arouses interest and presents the reasons why it is important to know geometry.

Science News Letter, August 20, 1938

Journalism

INTERPRETATIVE REPORTING—C. D. Macdougall—*Macmillan,* 682 p., $3.60. Almost a handbook of newspaper work, this volume will be of interest to anyone who wishes to know how the daily newspaper and the material it contains is produced.

Science News Letter, August 20, 1938

Architecture—Biography

CHANGING THE SKYLINE—Paul Starrett—*Whittlesey House,* 319 p., $3. The life story of the man who built the most famous early New York skyscraper, the Flatiron Building, and the greatest in the world, the Empire State Building, as well as the Lincoln Memorial in Washington and the great Pennsylvania Terminal in New York City. In a sense it is the biography of the modern office building as developed in this country.

Science News Letter, August 20, 1938

Physiology

ABC OF THE VITAMINS: A SURVEY IN CHARTS—Jennie Gregory—*Williams & Wilkins,* 93 p., $3. For anyone who wishes to keep up with the vitamin alphabet, this book of pictorial charts will be useful. A remarkably complete story is told in the charts and tables which are more speedily absorbed than mere text.

Science News Letter, August 20, 1938

Engineering

STRENGTH OF MATERIALS—Norman C. Riggs and Max M. Frocht—*Ronald Press,* 432 p., $3.75. A first course in the subject for use in colleges of engineering, emanating from the Carnegie Institute of Technology.

Science News Letter, August 20, 1938

Mathematics

NEW ANALYTIC GEOMETRY (Rev. ed.)—Percey F. Smith, Arthur S. Gale and John H. Neelley—*Ginn,* 326 p., $2. A new edition of a standard text book.

Science News Letter, August 20, 1938

Physiology

ATTAINING MANHOOD: A Doctor Talks to Boys About Sex—George W. Corner—*Harper,* 67 p., $1.25. By the professor of anatomy at the University of Rochester.

Science News Letter, August 20, 1938

Science

INTERNATIONAL ENCYCLOPEDIA OF UNIFIED SCIENCE, vol. I, No. 1: ENCYCLOPEDIA AND UNIFIED SCIENCE—Otto Neurath and others—*Univ. of Chicago Press,* 75 p., $1. The philosophy, plan and general details underlying the unity of science movement, stemming from international congresses held annually since 1934, is covered by contributions by Otto Neurath, Niels Bohr, John Dewey, Bertrand Russell, Rudolf Carnap, and Charles W. Morris.

Science News Letter, August 20, 1938

Science

INTERNATIONAL ENCYCLOPEDIA OF UNIFIED SCIENCE, Vol. I, No. 2: FOUNDATIONS OF THE THEORY OF SIGNS—Charles W. Morris—*Univ. of Chicago Press,* 59 p., $1. "Science and signs are inseparately interconnected, since science both presents men with more reliable signs and embodies its results in systems of signs. Human civilization is dependent upon signs and systems of signs, and the human mind is inseparable from the functioning of signs—if indeed mentality is not to be identified with such functioning."

Science News Letter, August 20, 1938

History

THE MEDITERRANEAN WORLD IN ANCIENT TIMES—Eva M. Sanford—*Ronald,* 618 p., illus., $4.50. A comprehensive text, which painstakingly covers the ancient progress of migrations, governments, and wars throughout the Mediterranean region. Instead of treating early civilizations individually, the history of various powers is meshed into a narrative in which the influence of one group on another is emphasized.

Science News Letter, August 20, 1938

Geology

MINERALS OF CALIFORNIA—Adolf Pabst *Calif. Div. of Mines,* 344 p., $1.75. Over 400 different minerals are described, and of these California minerals 54 were discovered in the state.

Science News Letter, August 20, 1938

Zoology

GENERAL FUNCTION OF THE GALL BLADDER FROM THE EVOLUTIONARY STANDPOINT—Frank. W. Gorham and Andrew Conway Ivy—*Field Museum,* 54 p., 75 c.

Science News Letter, August 20, 1938

Psychology

PSYCHOLOGY AND THE MOTORIST—Herbert A. Toops and S. Edson Haven—*R. G. Adams and Co.,* 265 p., $2. See page 120.

Science News Letter, August 20, 1938

•First Glances at New Books

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Science—Biography

AMERICAN MEN OF SCIENCE (6th ed.)—J. McKeen Cattell and Jaques Cattell, eds.—*Science Press,* 1608 p., $12. About 28,000 scientists are listed in this new edition of the only comprehensive directory in its field, an increase of 6,000 in the five years since the last edition. No reference shelf in the field of intellectual endeavor is complete without this volume.

Science News Letter, August 20, 1938

Science

THE ROCKEFELLER FOUNDATION ANNUAL REPORT, 1937—*Rockefeller Foundation, New York City,* 506 p., illus. Free upon direct request to Rockefeller Foundation. The major objective of the Rockefeller Foundation is "the well-being of mankind throughout the world." This report of activities in almost all intellectual fields and geographical areas reflects the age-old internationalism of science as well as the "new international barriers" of intolerance that have arisen in recent years. Despite the unhappy setbacks that world conditions have caused in some cases, the activities of the Rockefeller Foundation epitomize the breadth and unceasing advance of intellectual endeavor.

Science News Letter, August 20, 1938

Science

SCIENCE IN GENERAL EDUCATION—Report of the Committee on the Function of Science in General Education, Commission on Secondary School Curriculum—*Appleton-Century,* 591 p., $3. A detailed discussion of science teaching in relation to the problems of education in secondary schools and in the lower divisions of colleges. Aimed principally at science teachers, there are many booklists and much other material of that nature.

Science News Letter, August 20, 1938

Medicine

THE ACCIDENT OF BIRTH—The Editors of Fortune—*Farrar & Rinehart,* 40 p., 75 c. A reprint of an article discussing the birth control industry but not treating the techniques of contraception.

Science News Letter, August 20, 1938

Physiology

PLAN FOR MARRIAGE: AN INTELLIGENT APPROACH TO MARRIAGE AND PARENTHOOD—Joseph Kirk Folsom, ed.—*Harper,* 305 p., $3. The extra-curricular series of lectures on Marriage and Family Life given at Vassar in 1937 received wide attention. Here made available in book form are the facts and the ways of thinking which seemed to be useful and helpful to those who attended the lectures. It is a practical, helpful discussion of the functional and spiritual aspects of the love relationship.

Science News Letter, August 20, 1938

Medicine

BRITISH PERIODICALS OF MEDICINE, A CHRONOLOGICAL LIST—W. R. Lefanu—*Johns Hopkins,* 93 p., $1.25. The librarian of the Royal College of Surgeons of England has compiled this list of British medical periodicals, covering the period from 1684 through the first months of 1938. It is indexed by title.

Science News Letter, August 20, 1938

Chemistry

SMITH'S INTRODUCTORY COLLEGE CHEMISTRY (Rev. ed.)—James Kendall—*Appleton-Century,* 570 p., $3.25.

Science News Letter, August 20, 1938

Medicine

THE TRUTH ABOUT CHILDBIRTH—Anthony M. Ludovici—*Dutton,* 294 p., $2.50. The author, who is not a physician, has an idea that because, as he claims, "a healthy cat will purr when having her kittens," women should be able to give birth to children without benefit of anesthesia and find it a pleasurable experience.

Science News Letter, August 20, 1938

Physiology

LIFE, HEAT, AND ALTITUDE: PHYSIOLOGICAL EFFECTS OF HOT CLIMATES AND GREAT HEIGHTS—David Bruce Dill—*Harvard Univ. Press,* 211 p., $2.50. A considerable amount of scientific and even technical information is presented in this book, but the style is so readable and there are so many interesting illustrative stories that the layman as well as the scientist will enjoy the book.

Science News Letter, August 20, 1938

Chemistry

CHEMISTRY AT WORK—William McPherson, William Edwards Henderson, and George Winegar Fowler—*Ginn,* 672 p., $1.80. The college text book of McPherson and Henderson is so widely known that it is only necessary to say here that they have turned their ability to the preparation of a high school text in chemistry with the help of the supervisor of science of the city schools of Syracuse, New York.

Science News Letter, August 20, 1938

Biography

EDISON'S OPEN DOOR: THE LIFE STORY OF THOMAS A. EDISON, A GREAT INDIVIDUALIST—Alfred O. Tate—*Dutton,* 320 p., $3. Here is an anecdotal biography of Edison by his long-time secretary. The scientific achievements of Edison are less adequately covered in this book than they have been in previous biographies, but the author's intimate knowledge of Edison-the-man makes his writing one which will fill in the many blank spots in the world's knowledge of the life of America's greatest inventor.

Science News Letter, August 20, 1938

Biography

SUBMARINE: THE AUTOBIOGRAPHY OF SIMON LAKE—Herbert Corey—*Appleton,* 303 p., illus., $3. For years the now-veteran American inventor, Simon Lake, has been going not down to the sea in ships but down under the sea in ships. More than any one man in the world, probably, Mr. Lake knows his submarine. His autobiography will be a standard reference work in this field for many years to come. Mr. Corey's skill as a writer needs no comment.

Science News Letter, August 20, 1938

Biography—Surgery

J. B. MURPHY, STORMY PETREL OF SURGERY—Loyal Davis—*Putnam's,* 311 p., $3. The biography of this colorful figure who was one of America's great surgeons makes fascinating reading for layman as well as physician. Dr. Davis has done a splendid job. The characters live, the story is told dramatically, and while Murphy is the hero of the story, the author does not fail to give a just and understanding picture of the hero's opponents.

Science News Letter, August 20, 1938

Chemistry

INDUSTRIAL CHEMISTRY (2d ed.)—W. T. Read—*Wiley,* 605 p., $5. This book, now thoroughly revised, gives a well-balanced picture of modern industries from the standpoint of chemistry.

Science News Letter, August 20, 1938

Metallurgy

METALLURGY—Carl G. Johnson, R. S. Dean and J. L. Gregg—*American Technical Society,* 149 p., illus., $1.50. An introduction to the science of metallurgy by experts from Worcester Polytechnic Institute, the U. S. Bureau of Mines, and Battelle Memorial Institute.

Science News Letter, August 20, 1938